

WHAT IS CLAIMED IS:

1. A data storage system that provides a single system interface for multiple data storage devices, wherein the data storage system communicates with one or more client devices via a stateful protocol and wherein the data storage system redirects data requests received from the one or more client devices to the multiple data storage devices, the data storage system comprising:

a first storage device;

a second storage device; and

a dynamic session redirector in communication with at least one client device via a stateful protocol, wherein the redirector is configured to establish at least a first stateful protocol session with at least one client device, the dynamic session redirector is further configured to establish at least a second session with at least one of the first and second storage devices in response to the establishment of the first session.

2. A data storage system as in Claim 1 wherein the dynamic session redirector is further configured to establish at least a third session with at least one of the first and second storage devices in response to the establishment of the first session.

3. A data storage system as in Claim 1 wherein the first and second storage devices comprise network attachable storage.

4. A data storage system as in Claim 1 wherein the redirector is further configured to establish a session with the client using a stateless protocol.

5. A data storage system as in Claim 1 wherein the first and second storage devices comprise storage resources which are connected to a storage area network.

6. A data storage system as in Claim 1 further comprising a second dynamic session redirector in communication with the at least one client device via a stateful protocol, wherein the second redirector is configured to establish at least a third stateful protocol session with the at least one client device, the second dynamic session redirector configured to establish at least a fourth session with at least one of the first and second storage devices in the response to the establishment of the third session.

7. A data storage system as in Claim 6 wherein the second redirector and the first redirector are connected to one another and exchange information related to the state of the first stateful protocol session.

8. A data storage system that provides a single system interface for multiple data storage devices, wherein the data storage system communicates with one or more client devices via a stateful protocol and wherein the data storage system redirects data requests received from the one or more client devices to the multiple data storage devices, the data storage system comprising:

- a first network attachable storage device;

- a second network attachable storage device; and

- a dynamic session redirector connected to both the first and second network attachable storage devices and configured to communicate with at least one client device via a stateful protocol, wherein the redirector is further configured to establish at least a first stateful protocol session with at least one client device, the dynamic session redirector also configured to establish separate network sessions with the first network attachable storage device and the second network attachable storage device in response to the establishment of the first session.

9. The data storage system of Claim 8 wherein the dynamic session redirector further comprises a network switch, the first and second network attachable storage devices being connected to separate ports of the network switch.

10. The data storage system of Claim 8 wherein the at least one client device is unable to access the first or second network attachable storage devices except through the dynamic session redirector.

11. The data storage system of Claim 7 wherein the redirector is configured to communicate with the at least one client device using both a stateful and a stateless protocol.

12. The data storage system of Claim 8 wherein the network sessions between the redirector and the first and second network attachable storage devices are made using a stateful protocol.

13. A data storage system comprising:

- a first storage device comprising at least a first storage resource;

a second storage device comprising at least a second storage resource; and  
processor circuitry in communication with at least one data access device via a  
stateful protocol, wherein the processor circuitry is configured to establish at least a  
first stateful protocol connection with the data access device, the processor circuitry  
further configured to establish at least a second connection with at least one of the  
first and second storage devices in response to a request from the at least one data  
access device for access to one of the first or second storage resources which is  
received by the processor circuitry through the first connection.

14. A data storage system as in Claim 13 wherein the first storage device  
comprises a network attachable storage unit.

15. A data storage system as in Claim 13 wherein the processor circuitry further  
comprises a table for storing information associated with the first stateful protocol  
connection.

16. A data storage system as in Claim 13 wherein the processor circuitry further  
comprises a first network interface for sending and receiving information via the first stateful  
protocol session.

17. A data storage system as in Claim 16 wherein the processor circuitry further  
comprises at least a second network interface for sending and receiving information from the  
first and second storage devices via the second connection.

18. A data storage system comprising:

a first storage resource;

a second storage resource; and

a software module in communication with at least one data access device via a  
stateful protocol, wherein the software module is configured to establish at least a first  
stateful protocol connection with the data access device, the software module further  
configured to establish at least a second connection with at least one of the first and  
second storage resources in response to the establishment of the first connection.

19. A data storage system as in Claim 18 wherein the software module further  
comprises a table for storing information related to the at least first stateful protocol  
connection between the software module and the data access device.

20. A data storage system as in Claim 18 wherein the software module is further configured to establish at least a third connection with at least one of the first and second storage resources in response to the establishment of the first connection.

21. A data storage system as in Claim 20 wherein the software module is configured to receive data via both the second and third connections and is configured to prepare a response to the data access device based upon the data received via the second and third connections.

22. A data storage system as in Claim 21 wherein the response to the data access device is sent via the at least first stateful protocol connection.

23. A data storage system that provides a single system interface for multiple data storage resources, wherein the data storage system communicates with client devices via a stateful protocol and wherein the data storage system redirects data requests received from the client devices to one or more of the multiple data storage resources, the data storage system comprising:

- a first server;

- a second server;

- at least one storage resource connected to the first and second servers via a storage area network; and

- a dynamic session redirector in communication with at least one client device via a stateful protocol, wherein the redirector is configured to establish at least a first stateful protocol session with at least one client device, the dynamic session redirector further configured to establish at least a second session with at least one of the first and second servers in response to the establishment of the first session.

24. A data storage system that provides a single system interface for multiple data storage resources, wherein the data storage system communicates with client devices via a stateful network protocol and wherein the data storage system redirects data requests received from the client devices to multiple data storage resources, the data storage system comprising:

- a first front end device;

- a second front end device;

a storage network hub connected to the first and second front end devices;

a first storage resource connected to the storage hub;

a second storage resource connected to the storage hub; and

a dynamic session redirector in communication with at least one client device via a stateful protocol, wherein the redirector is configured to establish at least a first stateful protocol session with at least one client device, the dynamic session redirector further configured to establish at least a second session with the first front end device in response to the establishment of the first session, the dynamic session redirector further configured to establish at least a third session with the second front end device in response to the establishment of the first session, the dynamic session redirector further configured to redirect data received from the first and second front end devices via the second and third connections to the client device via the first connection.

25. A data storage system as in Claim 24 wherein the second and third connections comprise communication sessions.

26. A data storage system as in Claim 24 wherein the second and third connections comprise requests for access to one of the first or second storage resources.

27. A data storage system for providing a single system interface for multiple data storage resources to clients connecting to the data storage system across a network via a stateful network protocol, the system comprising:

one or more servers connected via a communications network;

a storage area network hub connected to the one or more servers;

one or more raid subsystems connected to the storage area network hub; and

a plurality of data storage resources connected to the one or more raid subsystems,

a dynamic session redirector connected to the one or more servers and configured to provide a single system interface for accessing the plurality of data storage resources to a client connected to the data storage system, the redirector configured to receive requests from a client using a stateful protocol and to provide a first communications session between the client and the redirector in response to a request from the client; the redirector further configured to create a second session to

at least one of the data storage devices in response to a request for access to that resource which is received through the first communications session, the redirector configured to receive data through the second session and to send this data to the client through the first session.

28. A data storage system for providing a single system interface for multiple data storage resources to clients connecting to the data storage system across a network via a stateful network protocol, the system comprising:

storage means for storing data; and

a first redirector means for receiving requests from at least one client via a first network connection using a stateful protocol, and for providing a first communications session in response to a request from the client, the redirector means also for providing a second communications session across a second connection, the redirector configured to receive data through the second session and to send the data to the client through the first session.

29. A method of providing a single system interface for multiple data storage devices, comprising:

receiving a request for data from at least one client device;

establishing at least a first stateful protocol session with the client device; and

establishing a second session with one of multiple storage devices in response to the establishment of the first stateful protocol session.

30. A method as in Claim 29 further comprising establishing a third session with a second of the multiple storage devices in response to the establishment of the first stateful protocol session.

31. A method as in Claim 29 wherein the storage devices comprise network attachable storage devices.

32. A method as in Claim 29 wherein the storage devices comprise storage resources connected to one another with a storage area network.

33. A method as in Claim 29 further comprising storing state data for the first stateful protocol session with the client device, and wherein the step of establishing a second session further comprises using the stored state data to establish the second session.

34. A method of storing data comprising:

receiving a first request from a data access device via a first stateful protocol connection; and

sending a second request to at least one of multiple data storage devices via a second connection;

receiving a first response from the at least one of multiple data storage devices via the second connection; and

sending a second response to the data access device via the first stateful protocol connection wherein the second response is related to the first request.

35. A method as in Claim 34 further comprising sending a third request to at least a second of the multiple data storage devices via a third connection; and

receiving a third response from the at least second of the multiple data storage devices via the third connection.

36. A method as in Claim 35 wherein responses from both the second and third connection are used to generate the third response which is sent to the data access device.

37. A method as in Claim 34 wherein the second connection is made across a storage area network.

38. A method as in Claim 34 wherein the multiple data storage devices comprise one or more disk arrays connected to a server.

39. A method for data storage comprising:

receiving data from a client device via a first stateful protocol network connection;

accessing at least one of multiple storage resources via at least a second network connection; and

transferring the data to the least one of the multiple storage resources via the second network connection.

40. A method as in Claim 39 further comprising accessing at least a second of the multiple storage resources via a third network connection; and

transferring at least a portion of the data to the second of the multiple storage resources via the third network connection.

41. A method as in Claim 39 wherein the multiple storage resources comprise network attachable storage devices.

42. A method as in Claim 39 wherein the multiple storage resources comprise disk drives configured to be accessed via a storage area network.

43. A data storage method comprising:

establishing at least a first stateful protocol session between a communications device and at least one client device; and

establishing a second session between the communications device and at least one storage area network in response to the establishment of the first stateful protocol session.

44. A method as in Claim 43 further comprising establishing a third session between the communications device and at the at least one storage area network in response to the establishment of the first stateful protocol session.

45. A method as in Claim 43 wherein the communications device comprises a dynamic session redirector which stores status information related to the first stateful protocol session.

46. A method as in Claim 45 wherein the status information stored by the dynamic session redirector is used to establish the second session with the storage area network.

47. A method comprising:

establishing at least a first stateful protocol session with at least one client device;

establishing at least a second session with a front end device in response to the establishment of the first stateful protocol session; and

redirecting data received from the front end device via the second session to the client device via the first stateful protocol session.

48. The method of Claim 47 wherein the front end device comprises a server connected to one or more data storage resources.

49. The method of Claim 47 further comprising establishing at least a third session with a second front end device in response to the establishment of the first stateful



protocol session, and the step of redirecting data further comprises redirecting data received from the second front end device via the third session to the client device via the first stateful protocol session.

50. A method of storing data comprising:

- receiving a request from a client device using a stateful protocol;
- providing a first communications session with the client device;
- accessing a second communications session with at least one data storage device in response to a request received through the first communications session;
- receiving data through the second session from the data storage device; and
- sending the data to the client device via the first communications session.

51. A data storage system for providing a single system interface for multiple data storage resources to clients connecting to the data storage system across a network via a stateful network protocol, the system comprising:

- a dynamic session redirector which receives requests from clients via a first communication means using a stateful protocol; and

- a plurality of data storage resources connected to the redirector via a second communication means,

- the dynamic session redirector configured to provide a single system interface to clients connected to the redirector, and to provide a first communications session across the first communication means in response to a request from the client, the redirector further configured to provide a second communications session across the second communication means, the redirector configured to receive data through the second session and to send this data to the client through the first session.